《Forecast for 2020 by I-O data in 1995.》

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1. Introduction

The Japanese Economy has experienced the rather rapid slowdown in growth and productivity since 1992 and the incomplete recoveries up to the present, 1997. According to the statistical data on the rate of growth in Real GDP(1), during the period after the first oil crisis from 1974 to 1980, the average rate of growth is 3.6%. As for the period of 12 years from 1980 to 1991, the average rate of growth could be calculated as 4.05%, or computed as 3.5% from 1980 to 1993. However, from 1992 to 1996 the average rate of growth is only 1.84% and we could calculate merely 1.86% for the Seven years from 1992 to 1998 by utilizing the short term forecast(2) for the rate of growth shown in the chapter 3 of this article. Therefore, we could conclude that the Japanese Economy had lost its strong vitalities and its high potentialities of adjustments to the changes of the world economy since 1992.

There would be numerous causes of the slowdown in growth of our economy among which one of the very clear and important causes is the rapid and large fluctuations of the yen/dollar exchange rate from 135yen to 79.75yen(3). So the stability of the exchange-rate would be one of the most serious economic problems of our future economy during the period from the end of this century to the beginning of the 21st century. Of course, there are a number of other political and economic problems in our economy, but the accelerated upward revaluation of yen, 79.75 yen in 1995, has given a very strong shocks to our economy and has put all other economic problems behind such rapid and large fluctuations of yen.

In this paper, therefore, we should like to examine the article entitled, "《Incohérence temporelle》 de la politique monétaire optimale: un argument en

faveur des zones cibles," by Daniel Laskar (《Time Inconsistency》 of the Optimal Monetary Policy: A Case for Target zones) in detail. After the detailed considerations of the purely theoretical models by Daniel Laskar, we have concluded that exchange-rate policies would remain necessary within the framework of target-zones which would seem to be the most appropriate regime for the transition process toward European Monetary Union. Up to August 2, 1993, the target zones have corresponded to the parities +/−2.25% and after that, the ranges of the normal fluctuations have stretched continuously to the parities +/−15%. The yen-dollar exchange-rate could not have such taget zones as that in European Exchange Mechanism, consequently, we would always have the large risk suffered from some large fluctutions caused by the international speculative funds which would seem to be amounted to 1000 billion dollars a day even in 1992(4).

Therefore,in spite of the detailed examinations of the purely theoretical models on the exchange-rates, we are not going to construct the yen doller exchange-rate equations and to estimate them to forecast the future exchange-rate behavior, on the contrary, we intend to assume that the previous changes of the yen-dollar exchange-rate from 1975 to 1995 would occur for about 20 years in our future. On these assumptions, we should like to utilize a macroeconometric models and Input-Output models and to make simulations, or in more detail, (1) A comparison of industrial structure based on the ratio of 24 industrial outputs in 1985 between in France and in Japan. (2) A short term forecast for 1998: 4 of both the France and the Japan. (3) A long term forecast for 2005 and 2020(5).

The French economist, M. Daniel Laskar considers the problem faced by a central bank which wants to stabilize both the exchange-rate and the rate of interest. In the absence of commitment the equilibrium policy (the "time consistent policy") is not optimal. It was shown that a commitment to an exchange-rate target zone system may be beneficial for the following two reasons which would be explained in detail in the chapter two of this article. Let's take considerations directly both of the model and the explanations by D. Laskar.

Note

(1) Economic Planning Agency, Economic Summary, (Keizai Yôran), 1996.

(2) Nippon Keizai Newspaper, Needs-World, Macro Forecast, # World Q 13, #WLDCONT 0697, 1997.

(3) Economic Planning Agency, op. cit., 1996.

(4) Dominique Plihon, 《Réflexions sur les régimes et les politiques de change: Le cas de la construction monétaire européenne.》 Économie Appliguée, Tome XLIX−1996−No3. pp. 95−122

(5) Nippon Keizai Newspaper, Needs I-O, Merlin, 1997.

2. Theoretical Frameworks of an exchange rate target zone System by D. Laskar and actual interpretations by D. Plihon

Model:
$$m_t - p_t = a y_t - b i_t + d_t \quad (1)$$
$$p_t = p_t^* + e_t - q_t \quad (2)$$
$$i_t = i_t^* + E_t e_{t+1} - e_t \quad (3)$$

All variables are in logarithm except the rate of interest[1]. The equation (1) is equal to the supply of and the demand for money, where mt represents the stock of money, p_t the domestic price, y_t the domestic output, i_t the rate of domestic interest and d_t a shock of the demand for money. The equation (2) defines the real exchange-rate, q_t, where e_t is the nominal exchange-rate and p_t^* the foreign price. The real exchange-rate as well as the output are supposed as exogenous[2]. The equation (3) shows the parity of the non covered interest rate, where i_t^* is the rate of foreign interest and E_t represents the mathematical expectation conditioned to the disposable information at the period t. It's supposed that at the period t, all previous and present variables are known to all the economic agents.
Eliminating p_t of the equations (1) and (2), we obtain:

$$m_t = e_t - b i_t + \omega_t \quad (4)$$

where ω is an exogenous variable defined

$$by\ \omega \equiv p_t^* - q_t + a y_t + d_t$$

If we consider the quadratic costs-equations, the loss function, L, could be written in the following way:

$$L = \frac{1}{2} \sum_{t=0}^{\infty} \beta^t (i_t^2 + \phi e_t^2),\ 0 < \beta < 1,\ \phi > 0 \quad (6)$$

where β is the discount factor and ϕ would determine the relative weight between two objectives (i and e).

It would be assumed that the rate of foreign interest, i_t^* could follow an autoregressive process of the first order:

$$i_t^* = \rho i_{t-1}^* + \varepsilon_t \quad 0 < \rho < 1 \quad (7)$$

where ε_t is a white noise[3].

《Discretionary》 Policy:

The 《Temporally coherent》 Policy

In the present model[4], the pertinent variable of state would be the foreign interest rate, i_t^*, when we consider the program of optimisation for (i_t, e_t). Consequently, we could write the anticipated exchange-rate, at first, in the next form:

$$E_t e_{t+1} = \Pi i_t^* \tag{8}$$

that which would imply, with the parity of the interest rate (3):

$$i_t = -e_t + (1+\pi) i_t^* \tag{9}$$

The solution (i_t, e_t) for the period, t, could be obtained by minimization of E and L under the constraints, (8) and, (9), this would be reduced to the problem of a static optimisation which consist in the minimisation of $\frac{1}{2}(i_t^2 + \phi e_t^2)$ under the constraint (9). The condition of the first order is:

$$i_t = \phi e_t \tag{10}$$

Substituting (10) in (9), we would obtain:

$$e_t = \frac{1+\pi}{1+\phi} i_t^* \tag{11}$$

which would imply, by utilizing (7):

$$E_t e_{t+1} = \frac{1+\pi}{1+\phi} \rho i_t^* \tag{12}$$

Identifying (12) and (8) would give us the following equation (13):

$$\pi = \frac{\rho}{\phi + 1 - \rho} \tag{13}$$

In utilising (10) and (11), we could get the values, e^D and i^D of the temporally coherent equilibrium in the case of discretionary policy: (5)

$$e_t^D = \frac{1}{\phi + 1 - \rho} i_t^* \tag{14a}$$

$$i_t^D = \frac{\phi}{\phi + 1 - \rho} i_t^* \tag{14b}$$

The Optimal Stationary Linear Rule:

An argument for a reduction in the fluctuations of the exchange-rate

The temporally coherent policy could not be optimal and could be even domi-

nated by other stationary linear rules. We are, therefore, going to try to determine the optimal stationary linear rule by supposing presently that the central bank could take the following rule, which could be represented by the next equations[6]:

$$e_t = \lambda i_t^* \tag{15a}$$

$$i_t = \mu i_t^* \tag{15b}$$

where λ and μ are the parameters which would be chosen in an optimal manner. The parity of the rate of interest, (3), would imply the following constraint, (16):

$$\mu = 1-(1-\rho)\lambda \tag{16}$$

The anticipated loss function, L, could be written in a following way:

$$EoL = \frac{1}{2}(\mu^2+\phi\lambda^2)\Big[\sum_{t=0}^{\infty}\beta^t Eoi_t^{*2}\Big]$$

Minimising EoL would return to find out the values of λ and μ which could minimise $\frac{1}{2}(\mu^2+\phi\lambda^2)$ under the constraint, (16). This gives the condition of the first order:

$$(1-\rho)\mu = \phi\lambda \tag{17}$$

The system [(15), (16), (17)] would give the next solutions for the optimal stationary linear rule:

$$e_t^{SO} = \frac{1-\rho}{\phi+(1-\rho)^2} i_t^* \tag{18a}$$

$$i_t^{SO} = \frac{\phi}{\phi+(1-\rho)^2} i_t^* \tag{18b}$$

where 《*SO*》 would refer to the 《optimal stationary》 linear rule.

If we would compare (14) with (18), we would perceive that e_t^D, i_t^D, e_t^{SO}, and i_t^{SO} have all the same sign as i_t^* and satisfy the following inequalities:

$$|e_t^{SO}| < |e_t^D| \tag{19a}$$

$$|i_t^D| < |i_t^{SO}| < |i_t^*| \tag{19b}$$

These relations indicate that, in the case of the discretionary policy, the exchange-rate is less stabilized than in the case of the optimal stationary linear rule, then, concerning with the rate of interest, the opposite is true[7].

In order to understand the inequalities, (19), the best, we could notice that the

temporally coherent solution is also stationary linear solution which would satisfy (15) and (16). However, the condition of the first order is not (17), but (10), which could be equally represented as follows:

$$\mu=\phi\lambda \tag{20}$$

This condition of the first order could be obtained by minimizing $\frac{1}{2}(\mu^2+\phi\lambda^2)$ under a constraint which is different from (16) and which could be written as a next equation:

$$\mu=1-\lambda+\pi \tag{20}$$

This condition of the first order could be obtained by minimizing $\frac{1}{2}(\mu^2+\phi\lambda^2)$ under a constraint which is different from (16) and which could be written as a next equation:

$$\mu=1-\lambda+\pi \tag{21}$$

where π is defined in (8) and is taken as given by the monetary authorities.

Let's assume that the central bank begins to follow the system where, in addition to the cost already existed in the social loss function, all deviation of the exchange-rate in proportion to its desired level would be penalized in an additonnal way, by the quadratic costs in this system[8]. We should consider, therefore, that the central bank would minimize the loss function, K, defined by the next equation:

$$K=L+\frac{\theta}{2}\sum_{t=0}^{\infty}\beta^t e_t^2,\ \theta>0$$

where θ represents the importance of penalties in this system. We have, therefore:

$$K=\frac{1}{2}\sum_{t=0}^{\infty}\beta^t\,[i_t^2+(\phi+\theta)e_t^2] \tag{22}$$

The difference between K and L is that $\phi+\theta$ replaces ϕ. Let's consider now the temporally coherent equilibrium in such a system that would be noted by θ. According to (14), substituting $\phi+\theta$ to ϕ, We have

$$e_t^{\theta}(\theta)=\frac{1}{\phi+\theta+1-\rho}\,i_t^* \tag{23a}$$

$$i_t^{\theta}(\theta)=\frac{\phi+\theta}{\phi+\theta+1-\rho}\,i_t^* \tag{23b}$$

If we compare (18) with (23), we see that optimal stationary linear rule (*SO*) could be obtained as a system where θ would take the value:

$$\hat{\theta}=\frac{\rho}{1-\rho}\phi>0 \tag{24}$$

Consequently, beginning to follow such a system, Q would lead to an anticipated social loss smaller than that for the discretionary policy, and would be, therefore, beneficial.

Another alternative interpretation[9] consists in remarking that this result could be also seen as the counterpart of that by Miller and Yhang [1994][10] where, by the fact of the quadratic nature of the loss function, the comparison bears the managed exchanges systems with the bands of fluctuations in the place of an exchange-rate target zone system. In effect, the managed exchanges systems would correspond to each relative weight given by the central bank to its objective of the exchange rate, because it would lead implicitly to a linear intervention rule. Such a rule in the case of the discretionary policy would be represented by (10) and (4):

$$i_t^D=\phi e_t^D \tag{25a}$$

$$m_t^D=\omega_t+(1-b\phi)e_t^D \tag{25b}$$

The equation (25a) would express this intervention rule in terms of《policy of the interest-rate》, in the other case the equation (25b) would express it in term of an intervention in the exchange market.(10)

The result would indicate, therefore, that, when the disrcretionary policy leads to a managed exchange determined by the parameter ϕ, it would be disirable to begin to take a managed exchange determined by the parameter $(\phi+\theta)$, where the exchange rate would less fluctuate. This would return to take a rule where one would intervene much more to stabilize the exchange-rate and which would be written alternatively:

$$i_t^{SO}=(\phi+\theta)e_t^{SO}=\frac{\phi}{1-\rho}e_t^{SO} \tag{26a}$$

$$m_t^{SO}=\omega_t^{SO}+(1-\frac{b\phi}{1-\rho})e_t^{SO} \tag{26b}$$

In order to conclude the analysis of this section, we are going to take the example of an extreme case of commitment on a system making decrease the fluctuation of the exchange-rate, which is the fixed exchange-rate system where these fluctuations would be reduced to zero. One would see that even under certain con-

ditions an equally extreme system could be beneficial. Reckoning from (6) and (14), one has, for the discretionary policy:

$$E_0L^D=\frac{\phi(1+\phi)}{(\phi+1+\rho)^2}\frac{1}{2}\left[\sum_{t=0}^{\infty}\beta^t E_0 i_t^{*2}\right]$$

in the case of the fixed exchange system, one has:

$$E_0L^F=\frac{1}{2}\left[\sum_{t=0}^{\infty}\beta^t E_0 i_t^{*2}\right]$$

This would imply that a fixed exchange system is preferable when the following inequality would be verified:

$$\phi(2\rho-1)>(1-\rho)^2 \tag{27}$$

We see immediately that the result would depend on the values of ρ and of ϕ[11].

The optimal policy with commitment and the《honey moon》effect of an exchange-rate target zone system.

The optimal policy with commitment could be obtained by searching the values $(i_t, e_t)\geqq 0$ which would minimize the anticipated loss E_0L under the constraint of parity of the interest-rate[12]. In this quadratic linear model where one has equivalence in the certainty, the obtained path by minimizing L under the constraint (3) where all the variables have been replaced by their mathematical expectations conditioned by the available information in the period 0, would give the values (i_0^P, e_0^P) for the period 0, and the anticipated values $(E_0 i_t^P, E_0 e_t^P)$ where surfix《P》is refered to the optimal values.

Let's define the variables, u_t, x_t and z_t by:

$$u_t\equiv E_0 i_t,\ x_t\equiv E_0 e_t,\ z_t\equiv E_0 i_t^*,\ t=0, 1, 2, \ldots$$

Then, we would resolve the program:

$$\min_{(u_t, x_t)_{t\geqq 0}}\frac{1}{2}\sum_{t=0}^{\infty}\beta^t(u_t^2+\phi x_t^2)$$

under the constraints:

$$x_{t+1}=x_t+u_t-z_t \tag{28}$$

$$z_t=\rho z_t \tag{29}$$

Let v_{t+1} be the covariable associated to the constraint (28). One must have $v_0=0$ because the initial value x_0 of the variable x_t is not given (the exchange-rate is not a predetermined variable). The conditions of the first order are given as follows:

$$u_t+v_{t+1}=0 \tag{30}$$

$$\phi x_t+v_{t+1}-\frac{v_t}{\beta}=0 \tag{31}$$

This imply[12]:

$$u_t=\phi x_t-\frac{v_t}{\beta} \tag{32}$$

Let's remark that, as the discretionary policy verifies $i_t^D=\phi e_t^D$, we see after (32) that we have $v_t^D=0$ for all,t. Equally, as we have $v_0^P=0$ for the optimal policy[13], this policy verifies the same equality $i_0^P=\phi e_0^P$ *at* $t=0$.

The solution of this program is calculated in a following way[14]: the characteristic equation of the system of differential equations given by [(28)−(31)] is:

$$(\rho-y)\left[(1+\phi-y)\left(\frac{1}{\beta}-y\right)-\frac{\phi}{\beta}\right]=0 \tag{A1}$$

It has a root $y_1=\rho<1$, and the roots y_2 and y_3 which are the solutions of the equation $P(y)=0$ where $P(y)$ is defined by:

$$P(y)\equiv\beta y^2-[\beta(1+\phi)+1]y+1 \tag{A2}$$

As we have $P(0)=1>0$ and $P\left(\frac{1}{\beta}\right)=-\phi<0$, and as the discriminant of $P(y)=0$ is positive, the equation $P(y)=0$ is positive, the equation $P(y)=0$ has two real roots y_2 and y_3 such as $0<y_2<\frac{1}{\beta}<y_3$. As we have $y_3>\frac{1}{\beta}$, the condition of transversality $\lim_{t\to\infty}\beta^t v_t=0$ would imply that the coefficient of y_3 would be equal to zero. Let's note $y_2=\gamma$ the least root. Then, in the case $\gamma\neq\rho$, the solution would be written:

$$\begin{cases} x_t=C_1\rho^t+C_2\gamma^t \\ v_t=B_1\rho^t+B_2\gamma^t \\ z_t=\bar{Z}_0\rho^t \end{cases} \tag{A3}$$

where the initial conditions are $Z_0=\bar{Z}$ and $v_0=0$.

Identifying the coefficient C_1, C_2, B_1 and $B2$ by utilizing (28), (30), (31) and v_0

$=0$, we would obtain:

$$x_t=\frac{\bar{Z}_0}{P(\rho)}[(1-\rho\beta)\rho^t-(1-\gamma\beta)\gamma^t] \tag{A4}$$

$$v_t=-\frac{\beta\phi\bar{Z}_0}{P(\rho)}(\rho^t-\gamma^t) \tag{A5}$$

where $P(\rho)$ is the value of $P(y)$ for $y=\rho$ We have. therefore:

$$x_0=-\frac{(\rho-\gamma)\beta}{P(\rho)}\bar{Z}_0 \tag{A6}$$

As we have $P(\gamma)=0$, we could write:

$$P(\rho)=P(\rho)-P(\gamma)=(\rho-\gamma)[\beta(1+\phi)+1]+\beta(\rho+y)] \tag{A7}$$

this would give:

$$x_0=\frac{\beta\bar{Z}_0}{\beta(1+\phi)+1-\beta(\rho+\gamma)} \tag{A8}$$

But, utilizing (2), $P(\gamma)=0$ would imply:

$$\beta(1+\phi)+1-\beta(\rho+\gamma)=\frac{1-\beta\rho\gamma}{\gamma}>0 \tag{A9}$$

x_0 has, therefore, the sign of $\bar{Z}_0$. As we have $u_0=\phi x_0$, u_0 has also the sign of $\bar{Z}_0$. Utilizing (14), (A8), (A9), $x_0=e_0$, $\bar{Z}_0=i_0^*$, and $\gamma<\frac{1}{\beta}$ we could easily obtain the inequality (33a). The inequality (33b) could be deduced immediately because we have $i_0^P=\phi e_0^P$ and $i_0^D=\phi e_0^D$ at the same time.

In the case, $\rho=\gamma$, we could obtain the solutions under the form:

$$x_t=(C_0'+C_1t)\rho^t$$
$$\eta_t=(B_0'+B_1't)\rho^t$$
$$z_t=\bar{Z}_0\rho^t$$

Identifying the coefficients, we would find:

$$C_0'=\frac{\beta}{\beta(\phi+1-\rho)+1-\rho\beta}\bar{Z}_0$$

$$C_1'=-\frac{1}{\rho}\frac{1-\rho\beta}{\beta(\phi+1-\rho)+1-\rho\beta}\bar{Z}_0$$

$$B_1'=-\frac{\beta}{\rho}\frac{\phi}{\beta(\phi+1-\rho)+1-\rho\beta}\bar{Z}_0,\ B_0=0$$

We have $x_0=C'_0$ in this case, this would give the same expression as that obtained by making $\rho=\gamma$ in (A8). The inequalities could be deduced, therefore, in the same manner in this case. If we consider the values for $t=0$, we could obtain that i_0^D, e_0^P, e_0^D and i_0^D would have all the same sign as i_0^* and would verify the following inequalities[15]:

$$|e_0^P|<|e_0^D| \tag{33a}$$

$$|i_0^P|<|i_0^D| \tag{33b}$$

These inequalities would indicate that the exchange-rate and the rate of interest are initially at the same time stabilized by the optimal policy all the more than the discretionary policy. If we compare these inequalities with the inequalities (19), we see that the optimal policy is initially entirely different from the rule SO. Because, as we have already underlined it, the rule SO would indicate that the rate of interest is contrarily less stabilised than by the discretionary policy. The reason of this difference is that, in the case of the optimal stationary linear rule, even initially the central bank must take consideration of the effect of this policy on the anticipations of the exchange-rate which have been formed before the period 0. From the point of view of the optimal policy, such a preoccupation would be without foundations. Formally, this would be represented by propriety $v_0^P=0$. While this equality is also verified for the discretionary policy ($v_0^D=0$), but it would be not verified for the solution SO. From (26a) and (32), we would obtain:

$$v_t^{SO}=-\beta\hat{\theta}E_0e_t^{SO}=-\rho\beta\frac{\psi}{\psi+(1-\rho)}i_0^*\rho^t$$

and therefore, $v_0^{SO}\neq 0$.

These purely theoretical models by D. Laskar have shown the merits of a commitment to an exchange-rate target zone system with two reasons. First, by stabilizing the exchange rate this makes the solution closer to a commitment to the optimal linear stationary rule. Second, through the "honey moon effect" a commitment to a target zone shares some additional property with the optimal policy under commitment[16]. At the end of his paper, the auther have explained that the coexistence of three different types of interventions in the exchange market would be desirable[17].

As the actual problems of the fluctuations of the exchange-rates in the SME, an exchange-rate target zone system has been fairly well functioned, in spite of the widening of the band from +/−2.25% to +/−15% in the crisis of the SME in 1992−1993[18]. The framework of target-zones, therefore, seems to be the most approp-

riate system for the transition process toward European Monetary Union[19]. So the results which have been obtained by the purely theoretical models on an exchange-rate target meaningful for European countries. However, for the Japanese Economy which has deeply suffered from the very abrupt appreciations of yen in 1993, 1994 and 1995, and from the large fluctuations of the yen-dollar exchange-rate, the very significant model by D. Laskar could give us only lessons on the importance of the stability of the exchange-rates. Up to this paper, we have forumulated various exchange-rate functions and have estimated them on the basis of statistical data. We have even made simulations of yen-dollar exchange-rate fairly correctly, for example, in 1993, we have already forecast the danger of the abrupt appeciations of yen to the level of 80 yen per doller during this century[20], but we could not have obtained the stability of the yen-dollor exchange-rate. We would expect the instability of the exchange-rate from 1997 to the beginning of 21st century by trying to stabilize the exchange-rate all the time.

We have, therefore, made the assumptions that the previous trends and changes of the exchange-rate since August 15, 1971 have been given to our economy, in spite of a number of efforts for the stabilization of the exchange-rate, and some similar changes would continue to occur in our future for a long time. On the basis of this most plausible assumption, we are going to forecast for 1998: 4 of both France and Japan, for 2005 and for 2020 by utilizing a bright new I-O data in 1995. In other words, formulating many exchange-rate functions and forecasting the perspective path of the exchange-rate and further more, making predictions of the long term trend of the exchange-rate would be very useful for our economy, however, according to Professor D. Plihon[21], there had been enormous speculative funds and, therefore, extremely large quantity of transactions have been carried out, for example, more than 1000 billion dollars had been exchanged per only one day. in the market even in 1992. So it would be very normal to assume that the perspective long term trend and fluctuations of the exchange-rate would be such as those of the exchange rate during the period from 1975 to 1995 that we have the actual I-O datta availability[22].

First of all, we are going to show a comparison of the ratio of 24 industrial sectors between in France[23] and in Japan by I-O data in 1985[24].

Note

(1) Daniel Laskar, 《Incohérence temporelle》 de la politique monétaire optimale, Revue Economique, janvier 1997, PP8−9.

(2) L. E. O. Svensson, 《Why Exchange Rate Bands? Monetary Independence in Spite of

Fixed Exchange Rates》, Journal of Monetary Economics. 33, 1994, pp. 157－199.

(3) Daniel Laskar, op. cit., p. 9.

(4) F. E. Kydland & E. C. Prescott, 《Rules rather than Discretion: The Time Inconsistency of Optimal Plans》, Journal of Political Economy, 85, 1997, PP. 473－491. D. Cohen & P. Michel, 《How Should Control Theory be used to Calculate a Time － Consistent Government Policy?》, Review of Economic Studies, 55, 1988, PP. 263－274.

(5) Daniel Laskar, op. cit., pp. 10－11.

(6) Daniel Laskar, op. cit., pp. 11－16.

(7) L. E. O. Sveensson, op. cit., pp. 157－199.

(8) D. Laskar, 《International Cooperation and Exchange Rate Stabilization》, Jounal of International Economics, 21, 1986, pp. 151－164.

(9) K. Rogoff, 《Optimal Degree of Commitment to an Intermediate Monetary Target》, Quartary Journal of Economics, November, 1985, pp. 1169－1189.

(10) M. Miller & L. Zhang, 《Optimal Target Zone: How an Exchange Rate Mechanism Can Improve Upon Discretion》, CEPR, Discussion Paper no 1031, 1994.

(11) D. Laskar, op. cit., p. 16.

(12) D. Laskar, op. cit., p. 17.

(13) D. Laskar, op. cit., p. 17.

(14) D. Laskar, op. cit., pp. 21－22.

(15) D. Laskar, op. cit., pp. 17－18.

(16) D. Laskar, op. cit., p. 5.

(17) D. Laskar, op. cit., p. 19.

(18) D. Plihon, op. cit., p. 117.

(19) D. Plihon, op. cit., p. 95.

(20) Sadao SUWA, "The Actual Situations of the Japanese Economy and the Exchange-rate," Lectures to the members of the Ministry of Construction, September 1993.

(21) D. Plihon, op. cit., PP. 95－122.

(22) Nippon Keizai Newspaper, Needs I-O, Merlin, 1997, Manuals on Needs I-O, 1993, 1994, 1995, 1996.

(23) Needs-I-O, Merlin, 1997.

(24) Tôyo Keizai Shinposha (Oriental Economist), Economate I-O, 1997.

3. Empirical Calculations based on the assumption of the changes of the exchange-rate with a secular trend from 1975 to 1995.

As for the empirical results, it would be enough to show various tables of computed numbers, therefore, we should like to represent only the definitions of variables for the short term forecast for 1998: 4 of France and Japan (3－2). In this simulation, we have changed 14 variables of reference case by only 1 unit of each variables to predict the effects of actual economic policies for the deregulation of our economy. Consequently, the results of the short term simulation of (3－2) would indicate the effects of changes of the 14 variables of both France and Japan.

Definition of variables[9] All data concerning with the France except specification of nationality

Endogenous variables=17

BOPCTRD@FR	FRANCE TRADE BALANCE 〈1〉 MILLIONS OF US$ INTERNATIONAL FINANCIAL STATISITICS CA 1975 TO 1995, CQ 1975:1 TO 1995: 4 AGC=NULL DP=0 UPDATE: 96/8/14
EXPIS90$@FR	Export Prices Index in terms of dollar
FREX&FR	Exchange-Rate of Franc/dollar
GDP@FR	Nominal GDP (Bils of Francs)
GDP80@FR	Real GDP (Bils of Francs, 1980=100)
GDP90$@FR	Real GDP (Bils of dollars, 1990=100)
WPI90&FR	Wholesale Price Index(1990=100)
	Exogenous variables=26
BOPCTRDOT@FR	Trade Balance (Mils of US$) (exp. the US, the Germany and the Japan)
GDPCAP90@JP	Real Potential GDP of Japan, (Bils of yens)
GDPGAP%@JP	Rate of GDP GAP of Japan, (%).
GDP1$@JP	Per Capita GDP of Japan, dollar.
EXCC90$@WLD	Real Export of Commodities of the World, (Bils of dolllar)
M2@JP	Money Supply of Japan, M2+CD (trils of yen)
GDP92@US	Real GDP of the U. S. 1992=100 (Bils of dollar)
GDP90@JP	Real GDP of the Japan 1990=100 (Bils of yen)
IOP90@JP	Real private plant and equipment investment of the Japan 1990=100 (Bils of yen)
Frex & JP	Exchange-rate of yen/$U. S. yen/dollar
IHP90@JP	Real Private Housing Investment of Japan (Bils of yen)
CP90@JP	Real Private Final Consumption of Japan, (Bils of yen)
EXCC$@JP	Export of Commodities of Japan, (Mils of dollar)
EX90@JP	Number of Employeds (10000persons)
IPUB@JP	Nominal Public Fixed Capital Formation of Japan (Bils of yens)

SWFREX	Switch Variable of exchange-rate (0: exogenous, 1: endogenous)
GDP@JP	Nominal GDP of Japan, (Bils of yens)
MX90@JP	Real Import of Commodities and Services of Japan, (Bils of yens)
WPI90 & JP	Wholesale Price Index of Japan, total (90=100)
CPI90 & JP	Consumers' Price Index of Japan, (90=100)
YWHI90@JP	Per Capita Income of Employed of Japan (1000yens)
RLGB & JP	Rate of Earning of Long Term Bond of Japan, (%)
BOPCRNT@JP	Current Balance of Payment of Japan, (Mils of dollar)
GDP92@US	Real GDP of the U. S. (Bils of dollar)
GDP90$@US	Real GDP of the U. S at price in 1990 (Bils of dollar)
GDP90$@G7	Real GDP of 7 Advanced Countries (Bils of dollar in 1990)

3– 1Comparisons between France and Japan

unit: a thouand million yens
million francs

		France	Japan
		1985	1985
1	Agriculture	328972	13604
2	Forestry & fisheries	23305	4184
3	Mining	88422	1941
4	Food	530485	35859
5	Textile products	193282	13471
6	Paper & Pulp	143461	12190
7	Chemicals	291479	27375
8	Petroleum products	268784	10134
9	Ceramics	95926	8432
10	Iron, Steel & 1 steel products	124643	22843
11	Non-ferrous metals	65874	6261
12	Metal product	145759	12463
13	General machinery	203069	25365
14	Electric machinery	219264	28845
15	Transport machinery	348033	32352
16	Other machinery equipment	75029	3764
17	Other manufacturing	296909	20597
18	Building & Public works	594086	63835
19	Electric power, gas & water utilities	186355	17230
20	Commerce	760834	73582
21	Finance & insurance	351072	63599
22	Transportation	338074	29661
23	Other services	2832343	154198
24	Others	11250	7412
25	Total intemediate input	8516710	689197

(ratio of compositions %)

		France	Japan
		1985	1985
1	Agriculture	3.9	2.0
2	Forestry & fisheries	0.3	0.6
3	Mining	1.0	0.3
4	Food	6.2	5.2
5	Textile products	2.3	2.0
6	Paper & Pulp	1.7	1.8
7	Chemicals	3.4	4.0
8	Petroleum products	3.2	1.5
9	Ceramics	1.1	1.2
10	Iron, Steel & steel products	1.5	3.3
11	Non-ferrous metals	0.8	0.9
12	Metal product	1.7	1.8
13	General machinery	2.4	3.7
14	Electric machinery	2.6	4.2
15	Transport machinery	4.1	4.7
16	Other machinery equipment	0.9	0.5
17	Other manufacturing	3.5	3.0
18	Building & Public works	7.0	9.3
19	Electric power, gas & water utilities	2.2	2.5
20	Commerce	8.9	10.7
21	Finance & insurance	4.1	9.2
22	Transportation	4.0	4.3
23	Other services	33.3	22.4
24	Others	0.1	1.1
25	Total intemediate input	100.0	100.0

	France		Japan	
	Column sum	coeficien of sensitivity	Column sum	coefficient of sensitivity
1 Agriculture	1.521605	1.002020	1.696861	0.772780
2 Forestry & fisheries	1.092069	0.719158	1.674421	0.762561
3 Mining	1.371239	0.902999	2.556600	1.164321
4 Food	1.354988	0.892298	1.741487	0.793104
5 Textile products	1.419547	0.934812	1.770503	0.806318
6 Paper & Pulp	1.368218	0.901010	2.204131	1.003800
7 Chemicals	1.517666	0.999426	3.356701	1.528700
8 Petroleum products	1.595148	1.050450	2.210362	1.006638
9 Ceramics	1.210312	0.797025	1.468980	0.668999
10 Iron, Steel & steel products	1.435197	0.945118	3.572399	1.626933
11 Non-ferrous metals	1.211057	0.797515	2.133405	0.971590
12 Metal product	1.468714	0.967190	1.573541	0.716618
13 General machinery	1.226951	0.807982	1.515444	0.690160
14 Electric machinery	1.289740	0.849330	1.731485	0.788549
15 Transport machinery	1.229645	0.809756	1.947566	0.886956
16 Other machinery equipment	1.051501	0.692443	1.231680	0.560929
17 Other manufacturing	1.546683	1.018534	1.811298	0.824897
18 Building & Public works	1.232001	0.811307	1.405901	0.640272
19 Electric power, gas & water utilities	1.582983	1.042439	2.068115	0.941856
20 Commerce	1.810230	1.192087	3.389075	1.543444
21 Finance & insurance	2.127557	1.401056	2.999218	1.365896
22 Transportation	2.039323	1.342952	2.565407	1.168331
23 Other services	3.682935	2.425317	4.485745	2.042887
24 Others	1.059603	0.697777	1.588571	0.723463
	36.444911	24.000000	52.698894	24.000000

Various coefficients of I–O

		France		Japan	
		Influence	Sensitivity	Influence	Sensitivity
1	Agriculture	1.047060	1.002020	0.818924	0.772780
2	Forestry & fisheries	0.895473	0.719158	0.890461	0.762561
3	Mining	0.810080	0.902999	0.869408	1.164321
4	Food	1.285461	0.892298	1.042529	0.793104
5	Textile products	1.098727	0.934812	1.148373	0.806318
6	Paper & Pulp	1.035047	0.901010	1.120542	1.003800
7	Chemicals	1.104781	0.999426	1.163228	1.528700
8	Petroleum products	0.799478	1.050450	1.020605	1.006638
9	Ceramics	1.090118	0.797025	0.967114	0.668999
10	Iron, Steel & 1 steel products	1.115879	0.945118	1.484298	1.626933
11	Non-ferrous metals	0.893672	0.797515	1.128041	0.971590
12	Metal product	1.014344	0.967190	1.026123	0.716618
13	General machinery	1.112464	0.807982	1.089415	0.690160
14	Electric machinery	1.051110	0.849330	1.287408	0.788549
15	Transport machinery	1.121002	0.809756	1.382009	0.886956
16	Other machinery equipment	0.947653	0.692443	1.030334	0.560929
17	Other manufacturing	1.070173	1.018534	0.993409	0.824897
18	Building & Public works	1.125124	0.811307	0.969772	0.640272
19	Electric power, gas & water utilities	0.877145	1.042439	0.813959	0.941856
20	Commerce	0.860341	1.192087	0.668687	1.543444
21	Finance & insurance	0.901239	1.401056	0.597604	1.365896
22	Transportation	0.950684	1.342952	0.781056	1.168331
23	Other services	0.890110	2.425317	0.757262	2.042887
24	Others	0.902833	0.697778	0.949440	0.723463

	France		Japan	
	substitution effect	degree of transformation	substitution effect	degree of transformation
	(R)	(S)	(R)	(S)
1 Agriculture	1.047060	1.002020	0.824638	0.999595
2 Forestry & fisheries	0.895473	0.719158	0.964907	0.996723
3 Mining	0.810080	0.902999	0.778328	1.020069
4 Food	1.285461	0.892298	0.983368	1.226263
5 Textile products	1.098727	0.934812	0.862487	1.182589
6 Paper & Pulp	1.035047	0.901010	0.931076	1.017500
7 Chemicals	1.104781	0.999426	1.124012	0.863998
8 Petroleum products	0.799478	1.050450	0.890155	1.005856
9 Ceramics	1.090118	0.797025	0.863765	1.069745
10 Iron, Steel & 1 steel products	1.115879	0.945118	0.830888	1.216733
11 Non-ferrous metals	0.893672	0.797515	0.946496	1.050567
12 Metal product	1.014344	0.967190	0.996719	1.094325
13 General machinery	1.112464	0.807982	0.912442	0.957230
14 Electric machinery	1.051110	0.849330	1.284864	0.908640
15 Transport machinery	1.121002	0.809756	1.169909	0.971386
16 Other machinery equipment	0.947653	0.692443	0.969398	0.901676
17 Other manufacturing	1.070173	1.018534	0.983151	1.001537
18 Building & Public works	1.125124	0.811307	1.024646	0.997160
19 Electric power, gas & water utilities	0.877145	1.042439	0.939698	1.049187
20 Commerce	0.860341	1.192087	0.864280	0.950717
21 Finance & insurance	0.901239	1.401056	1.041054	1.037524
22 Transportation	0.950684	1.342952	1.053123	0.945060
23 Other services	0.890110	2.425317	1.225037	0.989861
24 Others	0.902833	0.697778	0.776713	0.617394

3−2 Short term forecast for 1998: 4 of France and Japan[2]

```
NO. OF OPEN SIMULATIONS=5
#WLDCONT0697  #WLDCONT0297  #WLDCONT1196  #WLDCONT0996
#WLDCONT0796
COMMAND?
WAIT−−−
#WLDCONT0697 LOADED AS WLDCONT0697 (WORKING SIM).
SOLUTION INTERVAL IS 1997: 2 TO 1998: 4(68)
SOLVED   INTERVAL IS 1997: 2 TO 1998: 4
SOURCE IS SET TO WORKING SIM.
UPDATED AREA IS SET TO WORKING SIM.
COMMAND?
INTERVAL = 1997: 2 TO 1998: 4
COMMAND?
* WORKING SIMULATION
WLDCONT0697          RENAMED TO JPNGDPCAP
COMMAND?
GDPCAP90@JP          CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
GDPGAP%@JP           CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
GDP1$@JP             CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
GDP80@FR             CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
EXCC90$@WLD          CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
M2@JP                CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
YC@JP                CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
IOP90@JP             CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
IHP90@JP             CQ, 1997: 2 TO 1998: 4 CHAGED (WSIM)
COMMAND?
CP90@JP              CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
COMMAND?
```

```
EXCC$@JP              CQ, 1997:2 TO 1998: 4 CHAGED (WSIM)
COMMAND?
EX90@JP               CQ, 1997: 2 TO 1998: 4 CHAGED (WSIM)
COMMAND?
IPUB@JP               CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
NOT SOLVED.
COMMAND?
SWFREX                CQ, 1997: 2 TO 1998: 4 CHANGED (WSIM)
WAIT---
SYSTEM=25(*)
SOLVED.
SOLVED INTERVAL IS 1997: 2 TO 1998: 4
COMMAND?
CONTINUE?
A  JPNGDPCAP (WORKING SIM)
   GDPCAP90@JP UP 1000 AND GDP80@FR UP 10
B  #WLDCONT0697
   NEEDS World Economic Forecast, June '97
%  (A-B)/B*100
FREQ=CQ
```

GDP@JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	500492.	498570.	500456.	502990.	509511.
B	500492.	498570.	500456.	502990.	509511.
A-B	0.	0.	0.	0.	0.
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	515070.	519818.	522203.	528639.	531488.
B	510581.	515146.	517462.	523847.	526290.
A-B	4489.	4672.	4741.	4792.	5198.
%	0.9	0.9	0.9	0.9	1.0

	1998: 3	1998: 4
A	534673.	539009.
B	529854.	534456.
A-B	4819.	4554.
%	0.9	0.9

GDP90@JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	477217.9	475868.0	477357.4	481950.8	487850.4
B	477217.9	475868.0	477357.4	481950.8	487750.4

A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	487942.4	488781.9	492972.8	499043.5	501391.5
B	483716.4	484308.2	488404.8	494401.0	496284.2
A−B	4226.0	4473.8	4568.0	4642.6	5107.3
%	0.9	0.9	0.9	0.9	1.0

	1998: 3	1998: 4
A	502901.3	507641.6
B	498018.8	502982.5
A−B	4882.5	4659.1
%	1.0	0.9

MX90@JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	55703.1	56731.0	56576.6	57197.3	56753.0
B	55703.1	56731.0	56576.6	57197.3	56753.0
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	58568.1	58646.7	58772.0	60158.4	60781.6
B	58046.9	58090.6	58171.0	59538.0	60092.6
A−B	521.2	556.2	601.1	620.4	689.0
%	0.9	1.0	1.0	1.0	1.1

	1998: 3	1998: 4
A	60891.6	60914.2
B	60246.3	60265.8
A−B	645.4	648.4
%	1.1	1.1

WPI90&JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	92.7	92.7	92.7	93.1	94.1
B	92.7	92.7	92.7	93.1	94.1
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	95.4	95.4	95.4	95.6	95.6
B	95.5	95.5	95.6	95.9	95.9
A−B	−0.0	−0.1	−0.2	−0.2	−0.3
%	−0.0	−0.1	−0.2	−0.3	−0.3

	1998: 3	1998: 4
A	95.8	95.8
B	96.1	96.1
A−B	−0.3	−0.3
%	−0.3	−0.3

CPI90&JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	106.6	107.3	107.2	107.5	107.2
B	106.6	107.3	107.2	107.5	107.2
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	109.4	109.3	109.6	109.3	110.2
B	109.4	109.3	109.6	109.3	110.2
A−B	0.0	−0.0	−0.0	−0.0	−0.0
%	0.0	−0.0	−0.0	−0.0	−0.0

	1998: 3	1998: 4
A	110.1	110.5
B	110.1	110.5
A−B	−0.0	−0.0
%	−0.0	−0.0

YWH1@JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	5270.4	5321.8	5250.1	5254.0	5376.1
B	5270.4	5321.8	5250.1	5254.0	5376.1
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	5391.1	5326.9	5339.5	5470.6	5485.9
B	5390.4	5325.3	5337.0	5467.2	5482.0
A−B	0.7	1.6	2.5	3.4	3.9
%	0.0	0.0	0.0	0.1	0.1

	1998: 3	1998: 4
A	5414.4	5422.7
B	5410.5	5419.2
A−B	3.9	3.5
%	0.1	0.1

RLGB&JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	3.53	3.63	3.48	3.09	3.00
B	3.53	3.63	3.48	3.09	3.00
A−B	0.00	0.00	0.00	0.00	0.00

%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	2.99	3.38	3.44	3.54	3.59
B	2.97	3.36	3.43	3.54	3.58
A−B	0.02	0.01	0.01	0.00	0.01
%	0.6	0.4	0.3	0.1	0.1

	1998: 3	1998: 4
A	3.63	3.64
B	3.63	3.63
A−B	0.01	0.01
%	0.2	0.2

BOPCRNT@JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	71846.	57245.	72635.	64360.	60973.
B	71846.	57245.	72635.	64360.	60973.
A−B	0.	0.	0.	0.	0.
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	71572.	84077.	76400.	84227.	71476.
B	64170.	76781.	69188.	77047.	64894.
A−B	7402.	7296.	7212.	7180.	6582.
%	11.5	9.5	10.4	9.3	10.1

	1998: 3	1998: 4
A	79847.	86985.
B	73229.	80660.
A−B	6618.	6325.
%	9.0	7.8

FREX&JP	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	105.8	107.6	108.9	112.8	121.2
B	105.8	107.6	108.9	112.8	121.2
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	119.3	116.6	118.9	118.6	118.3
B	119.6	117.5	120.0	120.0	120.0
A−B	−0.3	−0.9	−1.1	−1.4	−1.7
%	−0.3	−0.7	−0.9	−1.2	−1.4

	1998: 3	1998: 4
A	118.3	118.2

B	120.0	120.0			
A−B	−1.7	−1.8			
%	−1.4	−1.5			

FREX&FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	5.04	5.16	5.09	5.18	5.10
B	5.04	5.16	5.09	5.18	5.10
A−B	0.00	0.00	0.00	0.00	0.00
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	5.11	5.10	5.10	5.10	5.10
B	5.10	5.10	5.10	5.10	5.10
A−B	0.01	0.00	0.00	−0.00	−0.00
%	0.1	0.1	0.0	−0.0	−0.1

	1998: 3	1998: 4
A	5.09	5.09
B	5.10	5.10
A−B	−0.01	−0.01
%	−0.1	−0.2

BOPTRD@FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	16431.	13180.	14596.	14050.	13562.
B	16431.	13180.	14596.	14050.	13562.
A−B	0.	0.	0.	0.	0.
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	13600.	13344.	13169.	13007.	12846.
B	13285.	13012.	12815.	12656.	12445.
A−B	314.	332.	353.	351.	401.
%	2.4	2.5	2.8	2.8	3.2

	1998: 3	1998: 4
A	12815.	12395.
B	12451.	12036.
A−B	364.	359.
%	2.9	3.0

BOPTRDOT@FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	22722.	17967.	20018.	15122.	17724.
B	22722.	17967.	20018.	15122.	17724.
A−B	0.	0.	0.	0.	0.
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	9713.	14959.	17187.	16591.	9405.
B	9713.	14959.	17187.	16591.	9405.
A−B	0.	0.	0.	0.	0.
%	0.0	0.0	0.0	0.0	0.0

	1998: 3	1998: 4
A	15792.	18013.
B	15792.	18013.
A−B	0.	0.
%	0.0	0.0

EXPIS90$@FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	110.2	107.0	108.6	107.6	108.6
B	110.2	107.0	108.6	107.6	108.6
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	108.3	109.9	109.8	111.0	110.5
B	108.3	109.9	109.7	110.7	110.1
A−B	−0.0	0.0	0.1	0.3	0.4
%	−0.0	0.0	0.1	0.2	0.3

	1998: 3	1998: 4
A	112.5	112.1
B	112.0	111.5
A−B	0.5	0.6
%	0.4	0.5

GDP@FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	7822.6	7828.7	7894.6	7916.1	7993.0
B	7822.6	7828.7	7894.6	7916.1	7993.0
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	8082.8	8146.9	8244.6	8344.0	8428.5
B	8070.7	8133.0	8228.6	8325.5	8407.5
A−B	12.1	13.9	16.0	18.5	20.9
%	0.1	0.2	0.2	0.2	0.2

	1998: 3	1998: 4
A	8449.8	8490.2
B	8427.1	8466.1
A−B	22.7	24.1

%	0.3	0.3			
GDP90$@FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	1277.5	1274.5	1284.3	1286.6	1292.4
B	1277.5	1274.5	1284.3	1286.6	1292.4
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0
	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	1305.2	1315.0	1326.2	1335.2	1344.6
B	1301.9	1311.7	1322.9	1331.9	1341.2
A−B	3.4	3.4	3.4	3.4	3.4
%	0.3	0.3	0.3	0.3	0.3
	1998: 3	1998: 4			
A	1353.4	1362.3			
B	1350.0	1358.9			
A−B	3.4	3.4			
%	0.2	0.2			
WPI90&FR	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	100.3	99.3	98.4	98.0	98.7
B	100.3	99.3	98.4	98.0	98.7
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0
	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	99.6	100.0	99.9	100.3	100.9
B	99.6	99.9	99.8	100.2	100.7
A−B	0.0	0.1	0.1	0.2	0.2
%	0.0	0.1	0.1	0.2	0.2
	1998: 3	1998: 4			
A	100.9	100.6			
B	100.7	100.3			
A−B	0.3	0.3			
%	0.3	0.3			
GDP92@US	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	6815.1	6893.0	6929.8	6995.3	7091.6
B	6815.1	6893.0	6929.8	6995.3	7091.6
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0
	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	7127.0	7179.5	7229.7	7267.6	7301.0

B	7112.2	7159.8	7207.1	7245.1	7278.3
A−B	14.8	19.7	22.6	22.5	22.6
%	0.2	0.3	0.3	0.3	0.3

	1998: 3	1998: 4
A	7332.7	7358.4
B	7309.3	7334.5
A−B	23.4	23.9
%	0.3	0.3

GDP90$@US	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	6376.7	6449.7	6484.0	6545.3	6635.5
B	6376.7	6449.7	6484.0	6545.3	6635.5
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	6668.6	6717.7	6764.6	6800.1	6831.4
B	6654.7	6699.3	6743.5	6779.1	6810.2
A−B	13.9	18.4	21.1	21.1	21.2
%	0.2	0.3	0.3	0.3	0.3

	1998: 3	1998: 4
A	6861.0	6885.1
B	6839.1	6862.8
A−B	21.9	22.4
%	0.3	0.3

GDP90$@G7	1996: 1	1996: 2	1996: 3	1996: 4	1997: 1
A	15594.4	15684.2	15769.1	15891.8	16050.5
B	15594.4	15684.2	15769.1	15891.8	16050.5
A−B	0.0	0.0	0.0	0.0	0.0
%	0.0	0.0	0.0	0.0	0.0

	1997: 2	1997: 3	1997: 4	1998: 1	1998: 2
A	16140.1	16237.1	16357.1	16475.5	16564.5
B	16077.3	16165.1	16280.2	16397.3	16482.5
A−B	62.8	71.9	76.9	78.2	82.0
%	0.4	0.4	0.5	0.5	0.5

	1998: 3	1998: 4
A	16644.2	16740.4
B	16563.8	16662.0
A−B	80.4	78.4
%	0.5	0.5

3–3 Long term forecast for both 2005 and 2020

Results of forecast (table of the balance between demand and supply) unit: a thousand million yens. 1990.

		(1) sum of intermediate demand	(2) consumption out of household	(3) private consumption	(4) consumption of general government
1	Agriculture, forestry & fisheries	134122	1187	39359	0
2	Mining	75858	0	4	0
3	Food	161673	14796	308036	0
4	Textile products	56083	2728	78311	0
5	Paper & Pulp	262720	2396	9846	0
6	Chemicals	285955	3309	43563	0
7	Petroleum & coal products	91327	253	35389	0
8	Ceramics	112924	614	4933	0
9	Iron, Steel	239922	0	−250	0
10	Non-ferrous metals	95178	25	696	0
11	Metal product	215604	738	4350	0
12	General machinery	116335	85	884	0
13	Electric Machinery	364850	4606	154819	0
14	Transport machinery	308162	0	100910	0
15	Machinery of precision	12928	450	9088	0
16	Other manufacturing	351836	6953	65890	0
17	Construction	105487	0	0	0
18	Electricity, gas & coal	144398	12	86982	0
19	Water utilities & Abandonment disposition	52768	41	23816	25207
20	Commerce	370220	30878	466783	0
21	Finace & insurace	313485	4	151725	0
22	Real estate	163241	0	610309	0
23	Transportation	318486	5039	189256	−810
24	Telecommunication & broadcasting	131377	2080	79420	0
25	Public service	1337	0	6957	267756
26	Education & Research	173926	0	96525	196982
27	Medical care & sanitation	25429	5611	476245	81938
28	Service for Business	862592	751	60795	0
29	Service for individuals	68094	161260	595389	0
30	Office & Service machinery	40799	0	917	0
31	Others	68167	0	186	0
32	Total intermediate input	5730752	244431	3669975	564664

		(5) public fixed capital formation	(6) private consumption	(7) net increase in inventories	(8) export
1	Agriculture, forestry & fisheries	0	1690	278	313
2	Mining	0	0	−6	196
3	Food	0	0	−288	1713
4	Textile products	44	3652	−241	5201
5	Paper & Pulp	0	0	0	2827
6	Chemicals	0	0	1165	37000
7	Petroleum & coal products	0	0	0	3313
8	Ceramics	0	0	−32	4506
9	Iron, Steel	−194	−1203	375	15015
10	Non-ferrous metals	0	1853	319	6210
11	Metal product	165	6548	172	4489
12	General machinery	15754	228210	668	88904
13	Electric Machinery	96978	229323	4285	210261
14	Transport machinery	2368	90304	492	108896
15	Machinery of precision	3812	16865	158	14749
16	Other manufacturing	2969	7925	410	14439
17	Construction	536612	560615	0	0
18	Electricity, gas & coal	0	0	0	290
19	Water utilities & Abandonment disposition	0	0	0	51
20	Commerce	19191	157653	643	21521
21	Finace & insurace	0	0	0	6825
22	Real estate	0	0	0	44
23	Transportation	1461	8299	175	54832
24	Telecommunication & broadcasting	0	0	0	988
25	Public service	0	0	0	781
26	Education & Research	0	0	0	179
27	Medical care & sanitation	0	0	0	0
28	Service for Business	5359	33519	0	12782
29	Service for individuals	0	0	0	6378
30	Office & Service machinery	0	39175	0	13588
31	Others	0	0	0	21223
32	Total intermediate input	702091	1421439	7636	635251

		(9) sum of final demand	(10) import	(11) domestic production
1	Agriculture, forestry & fisheries	42827	27212	149737
2	Mining	193	57083	18967
3	Food	324257	61879	424050
4	Textile products	89694	43512	102265
5	Paper & Pulp	15069	31905	245884
6	Chemicals	85037	36755	334237
7	Petroleum & coal products	38956	15846	114437
8	Ceramics	10021	7330	115615
9	Iron, Steel	13744	13802	239863
10	Non-ferrous metals	9103	30507	73774
11	Metal product	16462	5656	226409
12	General machinery	334506	20053	430788
13	Electric Machinery	700173	131602	933421
14	transport machinery	302971	39206	571927
15	Machinery of precision	45121	12450	45598
16	Other manufacturing	98587	56995	393428
17	Construction	1097227	0	1202714
18	Electricity, gas & coal	87284	0	231683
19	Water utilities & Abandonment disposition	49116	0	101883
20	Commerce	696668	4907	1061980
21	Finace & insurace	158554	14582	457457
22	Real estate	610353	0	773594
23	Transportation	258252	45517	531221
24	Telecommunication & broadcasting	82488	2085	211780
25	Public service	275494	0	276831
26	Education & Research	293686	0	467612
27	Medical care & sanitation	563794	0	589223
28	Service for Business	113206	35688	940110
29	Service for individuals	763027	62556	768565
30	Office & Service machinery	53680	3265	91214
31	Others	21409	16962	72613
32	Total intermediate input	7245486	777357	12198881

Results of forecast (table the balance between demand and supply) unit a thousand million yens

		(1) sum of intermediate demand	(2) consumption out of household	(3) private consumption	(4) consumption of general government
1	Agriculture, forestry & fisheries	137972	1435	43436	0
2	Mining	73454	0	5	0
3	Food	213460	17889	361291	0
4	Textile products	62119	3557	89097	0
5	Paper & Pulp	426607	2684	10866	0
6	Chemicals	406268	4315	69034	0
7	Petroleum & coal products	91728	306	44104	0
8	Ceramics	137900	837	7475	0
9	Iron, Steel	304200	0	−346	0
10	Non-ferrous metals	125492	32	1206	0
11	Metal product	319051	934	4728	0
12	General machinery	168381	161	1053	0
13	Electric Machinery	745696	8591	459369	0
14	transport machinery	497325	0	196708	0
15	Machinery of precision	18212	682	13566	0
16	Other manufacturing	507337	9068	80882	0
17	Construction	135854	0	0	0
18	Electricity, gas & coal	191590	17	131806	0
19	Water utilities & Abandonment disposition	87072	65	32986	44993
20	Commerce	516191	50410	515131	0
21	Finace & insurace	449608	6	282991	0
22	Real estate	241264	0	673522	0
23	Transportation	553799	7636	286783	−1074
24	Telecommunication & broadcasting	203310	3937	139637	0
25	Public service	499	0	10385	344483
26	Education & Research	342396	0	144097	253429
27	Medical care & sanitation	64224	11431	825034	135849
28	Service for Business	1667100	1646	94915	0
29	Service for individuals	154308	223350	888821	0
30	Office & Service machinery	134139	0	1729	0
31	Others	73887	0	168	0
32	Total intermediate input	9095556	348863	5237968	759963

		(5) public fixed capital formation	(6) private consumption	(7) net increase in inventories	(8) export
1	Agriculture, forestry & fisheries	0	1853	363	319
2	Mining	0	0	−8	259
3	Food	0	0	−377	1747
4	Textile products	54	5035	−232	5305
5	Paper & Pulp	0	0	0	3360
6	Chemicals	0	0	1412	51176
7	Petroleum & coal products	0	0	0	3649
8	Ceramics	0	0	−34	3642
9	Iron, Steel	−303	−1928	491	17848
10	Non-ferrous metals	0	2971	578	6334
11	Metal product	222	7751	260	5336
12	General machinery	28496	400249	728	132570
13	Electric Machinery	231987	452995	6405	421773
14	transport machinery	2853	124497	536	129443
15	Machinery of precision	5508	36400	165	18915
16	Other manufacturing	3687	10926	578	14727
17	Construction	697545	749767	0	0
18	Electricity, gas & coal	0	0	0	401
19	Water utilities & Abandonment disposition	0	0	0	71
20	Commerce	24946	227447	722	23701
21	Finace & insurace	0	0	0	11299
22	Real estate	0	0	0	49
23	Transportation	2208	12340	212	78161
24	Telecommunication & broadcasting	0	0	0	1869
25	Public service	0	0	0	1355
26	Education & Research	0	0	0	334
27	Medical care & sanitation	0	0	0	0
28	Service for Business	8225	54550	0	29265
29	Service for individuals	0	0	0	11890
30	Office & Service machinery	0	84783	0	23521
31	Others	0	0	0	34105
32	Total intermediate input	1093834	2313303	10127	947262

		(9) sum of final demand	(10) import	(11) domestic production
1	Agriculture, forestry & fisheries	47406	31125	154253
2	Mining	255	55939	17771
3	Food	380552	116692	477320
4	Textile products	102816	65749	99185
5	Paper & Pulp	16911	61907	381612
6	Chemicals	125937	73117	459088
7	Petroleum & coal products	48059	19860	119927
8	Ceramics	11920	11309	138512
9	Iron, Steel	15762	20889	299073
10	Non-ferrous metals	11121	52581	84032
11	Metal product	19230	13590	324691
12	General machinery	563257	46209	685428
13	Electric Machinery	1581120	444590	1882226
14	transport machinery	454037	107258	844104
15	Machinery of precision	75235	26481	66966
16	Other manufacturing	119867	142007	485197
17	Construction	1447312	0	1583165
18	Electricity, gas & coal	132224	0	323814
19	Water utilities & Abandonment disposition	78115	0	165187
20	Commerce	842358	8397	1350152
21	Finace & insurace	294297	40388	703517
22	Real estate	673571	0	914836
23	Transportation	386266	90960	849106
24	Telecommunication & broadcasting	145443	10560	338193
25	Public service	356223	0	356722
26	Education & Research	397859	0	740256
27	Medical care & sanitation	972313	0	1036537
28	Service for Business	188601	154746	1700955
29	Service for individuals	1124061	185008	1093361
30	Office & Service machinery	110032	14708	229462
31	Others	34273	20482	87678
32	Total intermediate input	10711320	1814550	17992326

Resut of simulation: transition of time series of domestic production
unit: a thousand Million yens, 1990.

	1975	1995	2005	2020
1 Agriculture, forestry & fisheries	166757	150449	149737	154253
2 Mining	20278	20048	18967	17771
3 Food	273643	393363	424050	4777320
4 Textile products	132244	106109	102265	99185
5 Paper & Pulp	56748	173884	245884	381612
6 Chemicals	167789	260744	334237	459088
7 Petroleum & coal products	163882	109387	114437	119927
8 Ceramics	76904	98235	115615	138512
9 Iron, Steel	216996	206730	239863	299073
10 Non−ferrous metals	45361	63987	73774	84032
11 Metal product	80839	168428	226409	324691
12 General machinery	125512	285573	430788	685428
13 Electric Machinery	98379	500930	933421	1882226
14 transport machinery	210109	421482	571927	844104
15 Machinery of precision	15707	33761	45598	66966
16 Other manufacturing	186157	315563	393428	485197
17 Construction	482570	918980	1202714	1583165
18 Electricity, gas & coal	109739	178779	231683	323814
19 Water utilities & Abandonment disposition	26434	73335	101883	165187
20 Commerce	430347	866860	1061980	1350152
21 Finace & insurace	162056	319698	457457	703517
22 Real estate	244534	669267	773594	914835
23 Transportation	77147	377568	531221	849106
24 Telecommunication & broadcasting	46376	143610	211780	338193
25 Public service	129657	233985	276831	356722
26 Education & Research	260837	339497	467612	740256
27 Medical care & sanitation	109527	384715	589223	1036537
28 Service for Business	102815	597269	940110	1700955
29 Service for individuals	233473	5811722	768565	1093361
30 Office & Service machinery	4015	17713	91214	229462
31 Others	90066	62371	72613	87678
32 Total intermediate input	4546895	9074042	12198881	17992326

(rates of growth %)

		1995/1975	2005/1995	2020/2005	2020/1995
1	Agriculture, forestry & fisheries	−0.5	−0.0	0.2	0.1
2	Mining	−0.1	−0.6	−0.4	−0.5
3	Food	1.8	0.8	0.8	0.8
4	Textile products	−1.1	−0.4	−0.2	−0.3
5	Paper & Pulp	5.8	3.5	3.0	3.2
6	Chemicals	2.2	2.5	2.1	2.3
7	Petroleum & coal products	−2.0	0.5	0.3	0.4
8	Ceramics	1.2	1.6	1.2	1.4
9	Iron, Steel	−0.2	1.5	1.5	1.5
10	Non-ferrous metals	1.7	1.4	0.9	1.1
11	Metal product	3.7	3.0	2.4	2.7
12	General machinery	4.2	4.2	3.1	3.6
13	Electric Machinery	8.5	6.4	4.8	5.4
14	transport machinery	3.5	3.1	2.6	2.8
15	Machinery of precision	3.9	3.1	2.6	2.8
16	Other manufacturing	2.7	2.2	1.4	1.7
17	Construction	3.3	2.7	1.8	2.2
18	Electricity, gas & coal	2.5	2.6	2.3	2.4
19	Water utilities & Abandonment disposition	5.2	3.3	3.3	3.3
20	Commerce	3.6	2.1	1.6	1.8
21	Finace & insurace	3.5	3.6	2.9	3.2
22	Real estate	5.2	1.5	1.1	1.3
23	Transportation	8.3	3.5	3.2	3.3
24	Telecommunication & broadcasting	5.8	4.0	3.2	3.5
25	Public service	3.0	1.7	1.7	1.7
26	Education & Research	1.3	3.3	3.1	3.2
27	Medical care & sanitation	6.5	4.4	3.8	4.0
28	Service for Business	9.2	4.6	4.0	4.3
29	Service for individuals	4.7	2.8	2.4	2.6
30	Office & Service machinery	7.7	17.8	6.3	10.8
31	Others	−1.8	1.5	1.3	1.4
32	Total intermediate input	3.5	3.0	2.6	2.8

(ratio of compositions %)

		1975	1995	2005	2020
1	Agriculture, forestry & fisheries	3.7	1.7	1.2	0.9
2	Mining	0.4	0.2	0.2	0.1
3	Food	6.0	4.3	3.5	2.7
4	Textile products	2.9	1.2	0.8	0.6
5	Paper & Pulp	1.2	1.9	2.0	2.1
6	Chemicals	3.7	2.9	2.7	2.6
7	Petroleum & coal products	3.6	1.2	0.9	0.7
8	Ceramics	1.7	1.1	0.9	0.8
9	Iron, Steel	4.8	2.3	2.0	1.7
10	Non-ferrous metals	1.0	0.7	0.6	0.5
11	Metal product	1.8	1.9	1.9	1.8
12	General machinery	2.8	3.1	3.5	3.8
13	Electric Machinery	2.2	5.5	7.7	10.5
14	transport machinery	4.6	4.6	4.7	4.7
15	Machinery of precision	0.3	0.4	0.4	0.4
16	Other manufacturing	4.1	3.5	3.2	2.7
17	Construction	10.6	10.1	9.9	8.8
18	Electricity, gas & coal	2.4	2.0	1.9	1.8
19	Water utilities & Abandonment disposition	0.6	0.8	0.8	0.9
20	Commerce	9.5	9.6	8.7	7.5
21	Finace & insurace	3.6	3.5	3.7	3.9
22	Real estate	5.4	7.4	6.3	5.1
23	Transportation	1.7	4.2	4.4	4.7
24	Telecommunication & broadcasting	1.0	1.6	1.7	1.9
25	Public service	2.9	2.6	2.3	2.0
26	Education & Research	5.7	3.7	3.8	4.1
27	Medical care & sanitation	2.4	4.2	4.8	5.8
28	Service for Business	2.3	6.6	7.7	9.5
29	Service for individuals	5.1	6.4	6.3	6.1
30	Office & Service machinery	0.1	0.2	0.7	1.3
31	Others	2.0	0.7	0.6	0.5
32	Total intermediate input	100.0	100.0	100.0	100.0

(detailed ratio of 80 sectors compositions %)

		1975	1994	2005	2020
35	Blister steel & pig-iron	1.9	0.7	0.5	0.4
36	steel material	2.3	1.5	1.3	1.2
37	Other Steel product	0.6	0.5	0.5	0.4
38	Non-ferrous metals fineries	0.3	0.2	0.2	0.2
39	Non-ferrous metals transformation	0.7	0.6	0.6	0.6
40	Metal products for Building & Public works	0.4	0.8	0.8	0.9
41	Other Metal products	1.4	1.0	1.0	0.9
42	General industrial machinery	0.9	1.0	1.0	1.1
43	Special industial machinery	1.2	1.1	1.2	1.3
44	Other general machinery	0.7	0.4	0.4	0.4
45	Office & service equipment	0.1	0.4	0.5	0.8
46	Household electric appliances	0.6	1.3	1.5	1.9
47	Electronics & telecommunications	0.5	3.5	4.5	6.0
48	Heavy electrical equipment	0.5	0.6	0.7	0.7
49	Other electric equipment	0.5	0.7	0.7	0.8
50	Automobile	3.3	4.2	4.4	4.6
51	Shipbuilding	0.9	0.3	0.2	0.2
52	Other transport equipment	0.4	0.3	0.2	0.2
53	Machinery of precision	0.3	0.4	0.4	0.4
54	Other manufacturing	0.6	0.6	0.5	0.4
55	Building & maintenance	7.0	6.0	5.8	5.5
56	Public works	3.6	4.6	4.6	4.8
70	Telecommunication	0.8	1.3	1.4	1.5
71	Broadcasting	0.2	0.3	0.3	0.3
72	Public service	2.8	2.7	2.5	2.3
73	Education	2.2	2.5	2.4	2.3
74	Research	0.3	1.1	1.4	1.9
75	Medical care & sanitation	2.4	3.4	3.6	4.0
76	Other public services	0.5	0.5	0.6	0.6
77	Services for business	2.3	6.6	7.3	8.6
78	Services for individual	5.1	5.5	5.4	5.3
79	Office & service goods	0.2	0.2	0.3	0.3
80	Others	1.8	0.7	0.6	0.6
81	Total intermediate input	100.0	100.0	100.0	100.0

Note

(1) Nippon Keizai Newspaper, Needs I-O, Merlin, 1997 and Manuals, 1993, 1994, 1995. 1996.
(2) Nippon Keizai Newspaper, Needs World, # World Q13, # WLDCONT0697, 1997, and manuals 1995, 1996.
(3) Needs I-O, Merlin, 1997.
(4) Needs I-O, Merlin, 1997.Tôyo Keizai (Oriental Economist) Shinpôsha, Economate I-O, 1997 and Manuals, 1993.

4. Conclusion

In spite of many significant contributions(1) to the fluctuations of the exchange-rate based on both theoretical frameworks(2) and econometric estimations, our economy would suffer from some abrupt volatilities, or some fairly gradual variations of the exchange-rate which would be an inevitable international environments to our economy. So, in stead of forecasting both short term and long term fluctuations of the exchange-rate, we have assumed that the all previous variations of the exchange-rate from 1975 to 1995, which had been contained completely in the I-O date, would possibly happen in our future. First of all, we have made a comparison of the ratio of industrial structure in 1985 between of Japan and France(4) which has been in an exchange-rate target zone system. Secondly we have made simulations of both Japan and France by changing 14 variables which would seem to be concerned with actual Japanese economic policies(5). In the next stage, thirdly, we have equally made simulations of our economy to forecast for 2005 and 2020 by utilizing the I-O data in 1995(6). At the end of the paper, we have added only a part of the detailed ratio of 80 sectors' compositions(7) to clarify the industrial structures of our economy.

Note

(1) Economie Appliquée, Les taux de change dans les années 90, Tome XLIX, No3－1996.
(2) D. Laskar, op. cit., pp. 5－21.
(3) S. Avouyi—Dovi & J. P. Laffarque, 《Dynamique des taux de change à l'intérieur du SME》, Annales d' économie et de statistique, 35, 1994, pp. 47－85.
(4) Nippon Keizai Newspaper, Needs I-O, Merlin, 1997, and manuals, 1994, 1995, 1996, 1997.
Tôyo Keizai (Oriental Economist) Shinpôsha, Economate I-O, 1997, Manual, 1993.
(5) Nippon Keizai Newspaper, Needs World, # World Q 13, # WLDCONT0697, and Manuals, 1995, 1996.
(6) Nippon Keizai Newspaper, Needs I-O, 1997.
(7) Needs I-O, 1997. Economate I-O, 1997.